**Transfer Center functions: Describing changes to nursing roles through goal-directed task analysis**

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**Background**

Patient transfer centers offer a centralized point of contact for transferring a patient into or between the in-patient care settings that comprise any one particular healthcare system. There are case studies on the improvements seen in patient throughput (Ayers, 2012) and physician satisfaction (Amedee, Maronge, & Pinsky, 2012) when these centers are introduced, but benchmarks, standards, staffing requirements or process guidelines were found to be lacking. Variations exist in the types of transfers supported (intra-facility, inter-facility, or both; within healthcare system vs. external to healthcare system) as well as additional services provided (e.g., transportation).

**Purpose**

- To begin to understand the cognitive work conducted within patient transfer centers and look for areas where human factors may contribute to this complex care coordination system (Carayon et al., 2011).
- This research can improve patient transfer centers by understanding their workflow better, with the aim of developing relevant measures and metrics of performance that can be used towards developing benchmark standards.

**Setting and System**

This patient transfer center was originally established in 2009 as part of a protocol for Level 1 vascular emergencies requiring transport (LifeLine) services. Its healthcare system includes two Level 1 Trauma Centers, one of which is the state’s only pediatric Level 1 Trauma hospital. The patient transfer center is physically located in the second Level 1 Trauma center hospital. It is currently evolving to manage all intrafacility transfers within its six core hospitals.

**The transfer center’s functions include:**
- Providing interfacility transfers into its healthcare system, from any location
- Providing interfacility transfers within its healthcare system
- Additional services include transport (air and ground)
- All roles within the patient transfer center are staffed with critical care nurses

**Method**

Mixed methods approach to knowledge elicitation and representations of work:
- Observations and contextual inquiry (Holtzblatt & Beyer, 1996)
- Goal directed task analysis (Endsley & Bolte, 2003)
- Work domain analysis (Vicente, 1999; Bisantz & Mazaeva, 2009)

These preliminary findings are based on six site visits, totaling 14 hours (~2.5 hours per visit), over the course of six months, by one observer.

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**Findings**

**Intake nurse goals identified:**
- Improve throughput
- Improve quality of care

**LifeLine goals identified:**
- Activate appropriate resources
- Monitor deployed resources

**Bed Management goals:**
- Provide the right bed at the right time
- Monitor available resources

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**Workarounds**

**The phone chain problem**
- Phone system within the transfer center is programmed to distribute call workload evenly between active phones
- Incoming calls are routed around the “chain” of phones
- An intake nurse may see a particular doctor call back, but is unable to directly answer the call if it has been assigned to another phone

**Workarounds included:**
- Calling out to other nurses the room to identify whom the phone call should be forwarded to
- Asking the caller to call back so the call routes to the appropriate nurse
- Passing the transfer case to the nurse on the assigned phone

**Missing bed requests**
- A constraint within the patient record system and financial admission system disrupts the automatic generation of a bed request in the bed management system, but only for a certain subset of patients
- This subset was discovered to be those patients who were requiring a interfacility transfer between a certain subset of hospitals that shared the same financial

**Workarounds included:**
- Until it can be resolved, intake nurses must remember to manually enter a bed request into the bed management system

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**Cognitive Artifacts**

Two artifacts were spoken of highly by nurses. Both of these were developed by the nurses in concert with a consultant:

- The 24/7 transfer worksheet (2-sided, 8.5”x11” paper)
- The "Flow" flip books keep processes, contacts, and phone numbers for hospitals and specialized services within an arm’s length of the intake nurses’ monitors and keyboard, helping to supplement memory resources

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**Implications for Future Research**

This preliminary work begins to describe the care coordination work being done within this patient transfer center, and identifies some areas for future research into patient transfer centers.

**Questions that arose included:**
- How might information capture methods be augmented to reduce workload and improve the completeness and accuracy of transfer data? (e.g., electronic pen)
- How will will current and developing information systems support the work of the currently evolving transfer nurse role? Will current workflows and workarounds be problematic?
- Bed management is currently segregated by individual hospital, with one nurse making bed allocation decisions within a single hospital. What will be the impact on workflow of having multiple nurses potentially competing for limited resources?
- In what other domains may we find analogous problems? (e.g., similarities and differences that might exist between the work of transfer center nurses and air traffic controllers?)
- What other clinical research is appropriate to leverage toward the patient transfer center (e.g., intracall hand-off failures, Org & Coiera, 2011)?

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**References**


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